

# PROJECT SELECTION METHODS

- ❑ Present Value
- ❑ Net Present Value
- ❑ Internal Rate of Return
- ❑ Payback Period
- ❑ Life Cycle Cost
- ❑ Benefit Cost Ratio
- ❑ Opportunity Cost

# PRESENT VALUE (PV)

Present value of money to be received in the future is determined by discounting the future value by interest rate that money could earn in the time period. Also referred to as discounted value.

$$PV = FV / (1 + i)^t$$

$FV$  = future value

$i$  = interest rate

$t$  = number of periods

## **Example**

*What is the present value of \$4,000 to be paid at the end of four years if the interest rate is 10%?*

$$PV = 4,000 / (1.10)^4$$

$$PV = 4,000 / 1.4641$$

$$PV = 2,732.05$$

# NET PRESENT VALUE (NPV)

From Wikipedia, net present value is the difference between the present value of cash inflows and the present value of cash outflows.

$$R_t / (1 + i)^t$$

$t$  = the time of the cash flow

$i$  = the discount rate (the rate of return that could be earned on an investment in the financial markets with similar risk.); the opportunity cost of capital

$R_t$  = the net cash flow (the amount of cash, inflow minus outflow) at time  $t$ .

Select the project with the maximum net present value regardless of time. Time is already factored into calculation.

## **Example**

*You have 2 projects to choose from. Project A will take 2 years and has a net present value of \$100,000. Project B will take 6 months and has a net present value of \$75,000.*

*You would select Project A.*

# INTERNAL RATE OF RETURN (IRR)

From Wikipedia, the internal rate of return on an investment is the "rate of return" that makes the net present value of all cash flows (both positive and negative) from a particular investment equal to zero.

IRR is an indicator of yield of an investment.

Select the project with the higher IRR.

## **Example**

*You have 2 projects to choose from. Project A has an IRR of 20% and will be completed in 6 years. Project B has an IRR of 15% and will be completed in 4 years.*

*You would select Project A.*

# PAYBACK PERIOD

Number of years required for an organization to recapture an initial investment.

Select a project with lower payback period.

## ***Example***

*You have 2 projects to choose from. Project A has an investment of \$400,000 and payback period of 3 years. Project B has an investment of \$ 150,000 and payback period of 6 years.*

*You would select Project A.*

# LIFE CYCLE COST

The overall estimated cost including direct and indirect costs and ongoing costs of operation and maintenance.

Life cycle costing includes acquisition, operating, and disposal costs when evaluating various alternatives.

For 2 projects having same investment, select a project with lower life cycle cost.

# BENEFIT COST RATIO (BCR)

Ratio of benefits to cost.

$$BCR = \text{benefits} / \text{costs}$$

BCR of  $> 1$  means that benefits (i.e. expected revenue) is greater than the cost. Thus, it is beneficial to do the project. When choosing between projects, select the project with the higher BCR.

## ***Example***

You have 2 projects to choose from. Project A has an investment of \$450,000 and BCR of 3.5. Project B has an investment of \$200,000 and BCR of 2.0.

*You would select Project A.*

# OPPORTUNITY COST

The difference in return between a chosen option and the option that was not selected. It is the measure of the unrealized benefits which would have been gained by choosing an alternate option. Thus, these are lost (forgone) benefits.

## ***Example***

*You have 2 projects to choose from. Project A has as an NPV of \$9,000. Project B has an NPV of \$3,000. What is the opportunity cost if Project A is selected?*

*The opportunity cost of Project A = \$9,000 - \$ 3,000 = \$6,000*



# SUNK COST

This is the cost that has already been incurred.

When deciding the best option, ignore sunk costs, because they have already been incurred and cannot be avoided.

## **Example**

*You have 2 projects to choose from. Project A had initial budget of \$1,500. \$1200 has already been spent. To complete project A, an additional \$400 is needed. Project B will require \$1000 for completion.*

*You would select Project A.*

*Cost of completing project A = \$400*

*Cost of completing project B = \$1000*